Does Time Fly or Drag? Maybe it Depends on how Long You Think it Takes

Giuseppe G. Miranda, Maura E. Wolfe, Rachel M. Major
Advisor: Susan T. Davis, Ph.D.

Research Lab
UNIVERSITY OF DAYTON

Background

Which seems faster, sitting in silence for a minute, or spending that minute watching a funny YouTube video? What is it about pleasant experiences that make time fly? Also, what happens when you expect a task to take longer than it actually does, or the opposite? Research shows that when people believe that time has passed unexpectedly quickly, they will rate tasks as more engaging, enjoyable, and less stressful.

The question for this research was to determine whether or not manipulating perceived time progression (PTP) would influence an individual's performance on a vigilance task, their PTP, as well as their workload. Research shows that there are several factors that influence PTP such as arousal, engagement, and motivation (Sackett, Meyvis, Nelson, Converse & Sackett, 2010) and oftentimes, many have a difficult time estimating how long an experience lasts. Expectation of how long a task will take should influence time perception as well as how the task is rated in terms of enjoyment and stress level.

On the surface, vigilance tasks appear to be simple tasks where observers are required only to commit themselves to looking or listening for the specified signals. However, these tasks inflict substantial demand upon the information-processing resources of participants. In addition, the perceived mental workload of vigilance tasks is substantial, and these tasks are stressful. Via vigilance performance questionnaires and subjective reports, data have indicated that participants feel less energetic, bored, irritated, and drowsy and suffer more from headaches at the end of the task than they do at the beginning (Temple, Warm & Dember, 2000). This area of research is of interest to human factors/ergonomic specialists because of the impact of vigilance in a wide range of automated systems in areas such as aviation, industrial process/quality control, medical monitoring/screening, airport /border security, and military surveillance (Dillard, et al 2013).

Hypotheses

There are three differing hypotheses for this experiment:

1. The participants' perceived time progression will be altered based on their expectations on how long the assigned task would take, regardless of the fact that all of the tasks will be 12 minutes in length.
2. In the *time drags* condition there will be an increase in perceived workload in comparison to the *time fli*es condition
3. Vigilance tasks will be perceived as difficult regardless of the condition

Method

Participants

- Undergraduate students at the University of Dayton

Tasks

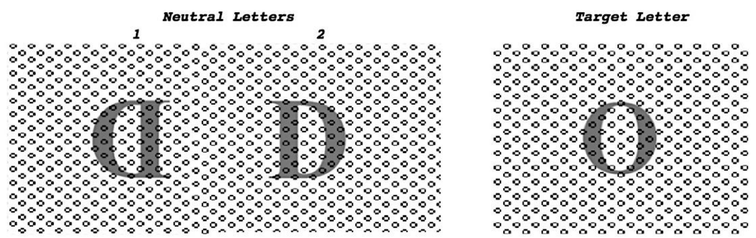
- Participants will complete a 12 minute vigilance task, under 1 of 6 possible conditions.
- 3x2 design below to create the 6 conditions

Time Drags	**Control**	**Time Flies**
Participants are told task lasts **6** minutes	Participants are told task lasts **12** minutes	Participants are told task lasts **24** minutes

Easy	**Hard**
High contrast between background and target letter	Low contrast between background and target letter

Procedure

- All participants first take a pre-task survey which assesses their current mood/state of mind prior to completing the vigilance task
- We assign the participants to one of the 6 conditions described above based on a randomized list of conditions
- Participants complete a short practice trial where their responses are marked by a tone indicating whether they are correct or incorrect
- The participants then complete the 12 minute task, under one of the six conditions listed above (see below for task stimuli)
- When they are finished, they complete a post-task survey in which they rank the workload associated with each of the conditions.
- The total time to complete the pre-task survey, vigilance task, and post-task survey is under 60 minutes



Special Thanks to:
Joel Warm, Ph.D. AFRL and UDRI
F.Thomas Eggemeier, Ph.D. Professor Emeritus, Psychology, University of Dayton
Victor Finimore, Ph.D. AFRL.

Expected Results

One expectation is for our results to be consistent with what Sackett et. al, (2010) found. Based on that study, it is expected that we will see a manipulation in the participants PTP. This is achieved by creating a mismatch between the time the participants expect to perform the task and the time it actually takes. Presumably, the PTP will be slower for participants in the time drags condition in which the actual task duration (12 minutes) was longer than their expected duration (6 minutes). For those in the time flies condition, where the actual task duration (12 minutes) was less than their expected duration (24 minutes) their PTP will be faster (Dillard et al, 2013).

Given that PTP is related to task demand, another possible expectation is that the participants in the time drags condition will increase their perceived workload compared to the participants in time flies condition, who are expected to have decreased perceived workloads (Block, Hancock, & Zakay, 2010).

Other research points to the fact that, in regards to workload, a vigilance task is a vigilance task no matter how quickly time files. If this were the case, we would expect to see that all six conditions will have similarly perceived workloads.

Implications

There are two main topics reflected in this research. The first is that the very nature of a vigilance task is the primary reason for increased perceived workload. The second, however, is that the increased boredom caused by the time drags condition will lead to a higher perceived workload. This distinction can be applied to numerous tasks that we do everyday, and one of these tasks is driving. When driving a car for a long period of time, is the stress of distracting stimuli such as controlling speed, merging traffic, safety risks, etc., enough to make the task stressful, or is it difficult to just simply fight the boredom?

Based on what we determine is the cause of the perceived workload increase, we can then apply this knowledge to vigilance tasks in a variety of settings. For example, if we find that boredom is the root cause of increased perceived workload, then determining ways to make a tedious vigilance task more enjoyable would be beneficial. Also, if we find that the nature of vigilance tasks are innately difficult, then in order to have improved performance and decreased perceived workload, the difficulty needs to be decreased or the work needs to be spread out across multiple individuals.

This research can also be applied to complex operational settings (cockpits, command and control centers, air traffic control, etc.). Oftentimes, operators are required to monitor several visual and auditory stimuli simultaneously. The risk of accidents and mishaps is dependent on the success of these vigilance tasks. The Air Force stresses the importance of efficient displays and quality task performance. Using the results of this study and similar studies, the Air Force can work on the development of a new generation of visual display systems that take into account human constraints as revealed in these studies.

References

Dillard, M. B., Warm, J. S., Funke, G. J., Vidulich, M. A., Nelson, W. T., Eggemeier, F. T., & Funke, M. E.(2013), Vigilance: Hard work even if time flies. *Proceedings of the Human Factors and Ergonomics Society 57th Annual Meeting*, 1114-1118.

Sackett, A. M., Meyvis, T., Nelson, L. D., Converse, B. A., & Sackett, A. L. (2010). You're having fun when time flies: The hedonic consequences of subjective time progression. *Association for Psychological Science, 21:1*, 111-117.

Temple, J. G., Warm, J. S., Dember, W. N., Jones, K. S., LaGrange, C. M., & Matthews, G. (2000). The effects of signal salience and caffeine on performance, workload, and stress in an abbreviated vigilance task. *Human Factors: The Jouranl of the Human Factors and Ergonomics Society, 42:2*, 183-193.